

CLAIMS

1 1. (original) A method for encoding a video stream to generate an encoded video bitstream,
2 comprising the steps of:

3 (a) encoding, into the encoded video bitstream, a first original frame/region in the video
4 stream using intra-frame coding to generate an encoded first frame/region; and

5 (b) encoding, into the encoded video bitstream, a second original frame/region in the video
6 stream using motion-based predictive coding, wherein at least some motion information used during the
7 motion-based predictive coding is excluded from the encoded video bitstream.

1 2. (original) The invention of claim 1, wherein all of the motion information used during
2 the motion-based predictive coding is excluded from the encoded video bitstream and the encoded video
3 bitstream does not explicitly include any motion information.

1 3. (original) The invention of claim 1, wherein step (b) comprises the steps of:

2 (1) decoding the encoded first frame/region to generate a decoded first frame/region;

3 (2) encoding the second original frame/region to generate an encoded second frame/region;

4 (3) decoding the encoded second frame/region to generate a decoded second frame/region;

5 (4) performing motion computation between the decoded second frame/region and the
6 decoded first frame/region to generate the motion information;

7 (5) applying the motion information to the decoded first frame/region to generate a
8 synthesized second frame/region;

9 (6) performing inter-frame differencing between the synthesized second frame/region and
10 the second original frame/region to generate residual errors; and

11 (7) encoding, into the encoded video bitstream, at least some of the residual errors.

1 4. (original) The invention of claim 1, further comprising the step of:

2 (c) encoding, into the encoded video bitstream, a third original frame/region in the video
3 stream using tweening based on the motion information used to encode the second original frame/region.

1 5. (original) A video encoder for encoding a video stream to generate an encoded video
2 bitstream, comprising:

3 (a) a frame/region type selector configured for selecting different processing paths for
4 encoding different frames/regions into the encoded video bitstream;

5 (b) a first processing path configured for encoding, into the encoded video bitstream, a first
6 original frame/region in the video stream using intra-frame coding to generate an encoded first
7 frame/region; and

8 (c) a second processing path configured for encoding, into the encoded video bitstream, a
9 second original frame/region in the video stream using motion-based predictive coding, wherein the
10 video encoder has an encoding mode in which at least some motion information used during the
11 motion-based predictive coding is excluded from the encoded video bitstream.

1 6. (original) The invention of claim 5, wherein the video encoder is a scaleable video
2 encoder that can be operated at a plurality of different encoding modes, wherein:

3 in a first encoding mode, all of the motion information is excluded from the encoded video
4 bitstream and the encoded video bitstream does not explicitly include any motion information; and

5 in a second encoding mode, at least some of the motion information is encoded into the encoded
6 video bitstream.

1 7. (original) The invention of claim 6, wherein:

2. in the second encoding mode, a first portion of the motion information is encoded into the
3 encoded video bitstream and a second portion of the motion information is excluded from the encoded
4 video bitstream; and
5 in a third encoding mode, all of the motion information is encoded into the encoded video
6 bitstream.

1 8. (original) The invention of claim 5, wherein:
2 the first processing path is configured for decoding the encoded first frame/region to generate a
3 decoded first frame/region; and
4 the second processing path is configured for:
5 (1) encoding the second original frame/region to generate an encoded second
6 frame/region;
7 (2) decoding the encoded second frame/region to generate a decoded second
8 frame/region;
9 (3) performing motion computation between the decoded second frame/region and
10 the decoded first frame/region to generate the motion information;
11 (4) applying the motion information to the decoded first frame/region to generate a
12 synthesized second frame/region;
13 (5) performing inter-frame differencing between the synthesized second
14 frame/region and the second original frame/region to generate residual errors; and
15 (6) encoding, into the encoded video bitstream, at least some of the residual errors.

1 9. (original) The invention of claim 8, wherein the encoding in the first processing path
2 and the encoding of the second original frame/region in the second processing path are based on
3 intra-frame wavelet encoding.

1 10. (original) The invention of claim 8, wherein:
2 the first processing path is configured for intra-frame coding the first original frame/region at a
3 high resolution;
4 the decoded first frame/region is at the high resolution;
5 the second processing path is configured for:
6 (i) spatially sub-sampling the second original image/region to generate a
7 low-resolution second frame/region having a resolution lower than the high resolution; and
8 (ii) intra-frame coding the low-resolution second frame/region to generate the
9 encoded second frame/region;
10 the decoded second frame/region is at the low resolution; and
11 the synthesized second frame/region is at the high resolution.

1 11. (original) The invention of claim 8, wherein the second processing path is configured
2 for:
3 (i) thresholding the residual errors to generate binary data; and
4 (ii) encoding, into the encoded video bitstream, the at least some of the residual errors based
5 on the binary data.

1 12. (original) The invention of claim 5, further comprising a third processing path
2 configured for encoding, into the encoded video bitstream, a third original frame/region in the video
3 stream using tweening based on the motion information used to encode the second original frame/region.

1 13. (original) The invention of claim 12, wherein:

2 the first processing path is configured for decoding the encoded first frame/region to generate a
3 decoded first frame/region; and

4 the third processing path is configured for:

- 5 (1) temporally interpolating the motion information used to encode the second
6 original frame/region;
7 (2) applying the temporally interpolated motion information to the decoded first
8 frame/region to generate a synthesized third frame/region;
9 (3) generating residual errors between the synthesized third frame/region and the
10 third original frame/region; and
11 (4) encoding, into the encoded video bitstream, at least some of the residual errors.

1 14. (original) The invention of claim 13, wherein:

2 the first processing path is configured for intra-frame coding the first original frame/region at a
3 high resolution;

4 the decoded first frame/region is at the high resolution;

5 the synthesized third frame/region is at the high resolution; and

6 the third processing path is configured for performing inter-frame differencing between the
7 synthesized third frame/region and the third original frame/region to generate the residual errors.

1 15. (original) A method for decoding an encoded video bitstream to generate a decoded
2 video stream, comprising the steps of:

3 (a) decoding, from the encoded video bitstream, an encoded first frame/region using
4 intra-frame decoding to generate a decoded first frame/region; and

5 (b) decoding, from the encoded video bitstream, an encoded second frame/region using
6 motion-based predictive decoding, wherein at least some motion information used during the
7 motion-based predictive decoding is generated by performing motion computation as part of the decoding
8 method.

1 16. (original) The invention of claim 15, wherein the encoded video bitstream does not
2 explicitly include any motion information and all of the motion information used during the
3 motion-based predictive decoding is generated as part of the method.

1 17. (original) The invention of claim 15, wherein step (b) comprises the steps of:

2 (1) decoding, from the encoded video bitstream, the encoded second frame/region to
3 generate a decoded second frame/region;

4 (2) performing the motion computation between the decoded second frame/region and the
5 decoded first frame/region to generate the motion information;

6 (3) applying the motion information to the decoded first frame/region to generate a
7 synthesized second frame/region;

8 (4) decoding, from the encoded video bitstream, encoded residual errors to generate decoded
9 residual errors corresponding to the synthesized second frame/region; and

10 (5) performing inter-frame addition between the decoded residual errors and the synthesized
11 second frame/region to generate an error-corrected decoded second frame/region.

1 18. (original) The invention of claim 15, further comprising the step of:

2 (c) generating a decoded third frame/region using tweening based on the motion information
3 used to decode the encoded second frame/region.

1 19. (original) The invention of claim 15, further comprising the step of de-interlacing a
2 decoded second frame/region generated during step (b) to generate two corresponding fields
3 corresponding to the decoded second frame/region.

1 20. (original) A video decoder for decoding an encoded video bitstream to generate a
2 decoded video stream, comprising:

3 (a) a frame/region type selector configured for selecting different processing paths for
4 decoding different encoded frames/regions from the encoded video bitstream;

5 (b) a first processing path configured for decoding, from the encoded video bitstream, an
6 encoded first frame/region in the video stream using intra-frame decoding to generate a decoded first
7 frame/region; and

8 (c) a second processing path configured for decoding, from the encoded video bitstream, an
9 encoded second frame/region in the video stream using motion-based predictive decoding, wherein the
10 video decoder has a decoding mode in which at least some motion information used during the
11 motion-based predictive decoding is generated by the video decoder performing motion computation.

Q 1 21. (original) The invention of claim 20, wherein the video decoder is a scaleable video
2 decoder that can be operated at a plurality of different decoding modes, wherein:

3 in a first decoding mode, the encoded video bitstream does not explicitly include any motion
4 information and all of the motion information is generated by performing the motion computation by the
5 video decoder; and

6 in a second decoding mode, at least some of the motion information is decoded from the encoded
7 video bitstream.

1 22. (original) The invention of claim 21, wherein:

2 in the second decoding mode, a first portion of the motion information is decoded from the
3 encoded video bitstream and a second portion of the motion information is generated by performing the
4 motion computation by the video decoder; and

5 in a third decoding mode, all of the motion information is decoded from the encoded video
6 bitstream.

1 23. (original) The invention of claim 20, wherein:
2 the second processing path is configured for:

3 (1) decoding, from the encoded video bitstream, the encoded second frame/region to
4 generate a decoded second frame/region;

5 (2) performing the motion computation between the decoded second frame/region
6 and the decoded first frame/region to generate the motion information;

7 (3) applying the motion information to the decoded first frame/region to generate a
8 synthesized second frame/region;

9 (4) decoding, from the encoded video bitstream, encoded residual errors to generate
10 decoded residual errors corresponding to the synthesized second frame/region; and

11 (5) performing inter-frame addition between the decoded residual errors and the
12 synthesized second frame/region to generate an error-corrected decoded second frame/region.

1 24. (original) The invention of claim 23, wherein the decoding in the first processing path
2 and the decoding of the second encoded frame/region in the second processing path are based on
3 intra-frame wavelet decoding.

1 25. (original) The invention of claim 23, wherein:
2 the decoded first frame/region is at a high resolution;

3 the decoded second frame/region is at a low resolution lower than the high resolution;
4 the synthesized second frame/region is at the high resolution; and
5 the error-corrected decoded second frame/region is at the high resolution.

1 26. (original) The invention of claim 20, further comprising a third processing path
2 configured for generating a decoded third frame/region using tweening based on the motion information
3 used to decode the encoded second frame/region.

1 27. (original) The invention of claim 26, wherein the third processing path is configured for:
2 (1) temporally interpolating the motion information used to decode the encoded second
3 frame/region; and
4 (2) applying the temporally interpolated motion information to the decoded first
5 frame/region to generate the decoded third frame/region.

1 28. (original) The invention of claim 27, wherein the decoded third frame/region is not
2 explicitly represented in the encoded video bitstream.

Q 1 29. (original) The invention of claim 27, wherein the third processing path is configured for:
2 (i) applying the temporally interpolated motion information to the decoded first
3 frame/region to generate a synthesized third frame/region;
4 (ii) decoding, from the encoded video bitstream, encoded residual errors for an encoded third
5 frame/region to generate decoded residual errors; and
6 (iii) applying the decoded residual errors to the synthesized third frame/region to generate the
7 decoded third frame/region.

1 30. (original) The invention of claim 29, wherein:
2 the decoded first frame/region is at a high resolution;
3 the synthesized third frame/region is at the high resolution; and
4 the third processing path is configured for performing inter-frame addition between the
5 synthesized third frame/region and the decoded residual errors to generate the decoded third frame/region
6 at the high resolution.

1 31. (original) The invention of claim 20, wherein the second processing path is configured
2 for de-interlacing a decoded second frame/region to generate two corresponding fields corresponding to
3 the decoded second frame/region.

1 32-35. (canceled)

1 36. (new) The invention of claim 1, wherein the motion-based predictive coding comprises:
2 motion computation during which one or more motion vectors are determined for the second
3 original frame/region; and
4 motion compensation based on the one or more motion vectors determined during motion
5 computation, wherein at least one of the motion vectors used during the motion compensation is excluded
6 from the encoded video bitstream.

1 37. (new) The invention of claim 36, wherein each motion vector used during the motion
2 compensation is excluded from the encoded video bitstream.

1 38. (new) The invention of claim 15, wherein the motion-based predictive decoding further
2 comprises motion compensation for the encoded second frame/region based on one or more motion

3 vectors, wherein at least one of the motion vectors used during the motion compensation is determined
4 during the motion computation.

1 a 39. (new) The invention of claim 38, wherein each motion vector used during the motion
2 compensation is determined during the motion computation.
